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(54) Title: ROTATING ACTUATOR

(57) **Abstract:** The invention relates to a rotating actuator with a rotatably mounted setting shaft (24) and an activatable mechanical stop device (23) for generating a stop to limit the rotation of the setting shaft (24) in one or the other direction of rotation. Said actuator also comprises an angle detection device for detecting a rotation of the setting shaft (24). In order to limit the rotation of the setting shaft (24) in a direction of rotation, the activated stop device (23) acts upon the setting shaft (24) in such a way as to prevent the setting shaft (24) from executing another rotation in the direction of rotation which is to be blocked by the stop device (23) by means of a stop associated with a stop arrangement acting mechanically on said setting shaft, and maintain the rotation of the setting shaft (24) in a direction of rotation counter to the stop with slip in the stop arrangement. The slip provided by the stop arrangement is dimensioned in such a way that movement of the setting shaft (24) in the direction of rotation counter to the stop is detected by the angle detection device, or the stop device comprises two individual and independently triggered, mechanical stop devices acting mechanically on the setting shaft. One of said stop devices is provided in order to act as a stop for limiting the rotation of the setting shaft to the right, and another limits the rotation of the setting shaft to the left.

Rotating Actuator

The invention relates to a rotating actuator with a rotatably mounted setting shaft and an activatable mechanical stop device for generating a stop to limit the rotation of the setting shaft in one or the other direction of rotation, and with an angle detection device for detecting a rotation of the setting shaft.

Rotating actuators are used, for example, in data input devices, in which the cursor can be controlled in various menu levels by turning the rotating actuator and, if necessary, by pressing or swiveling said rotating actuator. For example, such a rotating actuator can be part of a so-called joystick. One such rotating actuator is known from DE 197 12 049 A1. In this previously known rotating actuator, the gearing of a device for generating a haptic interface is coupled with the setting shaft. This device is an electric motor which, when correspondingly actuated, exposes the setting shaft to a torque opposite the rotation. Various haptic interfaces can be provided depending on the triggering or activation of the electric motor both in terms of the current intensity acting on the electric motor and as a function of the current rotational angle position of the setting shaft. An angle detection device is allocated to the rotating actuator to determine the current rotational angle position. The rotating actuator can also be operated without triggering the electric motor, and hence without any haptic interface to shape the rotation. Therefore, it is possible to operate one and the same rotating actuator both without and with a predetermined haptic interface or with varying haptic interfaces as a function of the respective mode of the rotating actuator. This is advantageous relative to those rotating actuators having a haptic interface-generating device that resembles a mechanical latch with a latching cam plate and one or more latching elements that engage in the latching cam plate to generate a haptic interface when turning the handle. In these mechanical haptic interface-generating devices, the haptic interface cannot be enabled or disabled and, in particular, the haptic interface also cannot be switched.

The rotating actuator known from this document also makes it possible to simulate an end stop by appropriately supplying current to the electric motor. However, the disadvantage

to this configuration is that simulating an end stop in this rotating actuator not only results in a high current consumption, but that the counteracting force provided by the electric motor to simulate the end stop can also be surmounted. Providing the user with an end stop that cannot be so easily surmounted would require that appropriately conceived electrical and electronic components be made available, something which is unfeasible, at least in the automotive industry. In addition, the current required for this purpose is sometimes not always available in a motor vehicle, for example.

DE 196 46 226 A1 discloses another rotating actuator having a stop device that can be enabled and disabled. The setting shaft is rigidly connected to a wheel provided with pockets in which the ball of a latching device engages, so that the wheel is latched and turned. A compression spring acts on the ball, and the spring is also arranged so that it is acted on by an electromagnet, with which the spring bias acting on the ball can be adjusted. The electromagnet itself rests against an abutment that is fixed relative to the setting shaft. This abutment is situated radially to the setting shaft. This stop device can be set in such a way that the electromagnet moves the spring to a blocking position, as a result of which the ball engages in a pocket of the wheel allocated to the setting shaft like a bolt and blocks rotation. The ball is then held in such a pocket in a precisely form-fitting manner.

The perceived disadvantage to this stop device that acts mechanically on the setting shaft is that a stop can only be established in those positions of the wheel with its pockets relative to the ball in which the ball can engage in a pocket of the wheel. Therefore, a stop cannot be produced in intermediate positions. In order to again disable the enabled stop device that impedes the rotation of the setting shaft so that the setting shaft can be turned once more, and hence actuated, the electromagnet must be supplied with less or no current beforehand via additional actuation, thereby making it possible to further latch and turn the setting shaft.

It is inadvisable to perform such an additional, active operation.

Proceeding from this discussed prior art, the object of the invention is therefore to further develop a generic rotating actuator as mentioned at the outset in such a way as to generate a stop to limit a direction of rotation that cannot be easily surmounted therein given a rotating actuator in quasi-arbitrary rotational angle positions of the setting shaft.

This object is achieved according to the invention by virtue of the fact that the stop device comprises two individual and independently triggered stop mechanisms that mechanically act on the setting shaft, of which one provides a stop for limiting a rotation of the setting shaft to the right, while another stop mechanism is provided to limit a rotation of the setting shaft to the left.

Further, this object is achieved according to the invention by virtue of the fact that, in order to limit the rotation of the setting shaft in a direction of rotation, the activated stop device is designed to act on the setting shaft in such a way as to prevent the setting shaft from executing another rotation in its direction of rotation to be blocked by the stop device by means of a stop associated with a stop device acting mechanically on the stetting shaft, and maintain the rotation of the setting shaft in a direction of rotation counter to the stop with slip in the stop arrangement, wherein the slip provided by the stop arrangement is dimensioned in such a way that a movement by the setting shaft in the direction of rotation counter to the stop can be detected by the angle detection device.

In the rotating actuator according to the first proposed solution, the stop device comprises two individual and independently triggered stop mechanisms that are arranged in such a way as to each act mechanically on the setting shaft in one direction in order to prepare or generate a stop for limiting the rotation of the setting shaft. This measure causes the stop device to become activated or enabled effective only for the direction of rotation that requires a stop given the current use of the rotating actuator. By contrast, such a stop mechanism does not act in the direction of rotation of the setting shaft counter to the current direction of rotation, so that the setting shaft can be readily actuated in the direction of rotation acting counter to the stop. Therefore, the setting shaft is not prevented from moving in a direction of rotation away from the enabled stop mechanism,

and its movement can be detected by the angle detection device. Once such a rotation of the setting shaft away from the set stop has been detected, the initially activated stop mechanism can be disabled again, so that the setting shaft can subsequently be turned in the other, originally limited direction of rotation once again. The two stop mechanisms for limiting the right or left rotation of the setting shaft are designed to act mechanically on the setting shaft. As opposed to known prior art, then, the subject matter of this rotating actuator does not require an additional actuating step to again release the enabled stop device; rather, it is enough to conventionally actuate the setting shaft in the direction of movement away from the stop to release the stop.

According to the additional proposed solution, the rotation of the setting shaft is limited by a single stop device, which is used to block a rotation of the setting shaft in both directions. However, the stop device impedes the setting shaft with slip in the direction away from the rotational direction-limiting stop of a stop arrangement that acts mechanically on the setting shaft. In this case, the provided slip in this direction is dimensioned in such a way as to enable a rotation of the setting shaft or handle in the direction leading away from the active stop, at least to an extent that the angle detection device can detect this rotation. As a consequence, the subject matter of this rotating actuator also makes it possible to cancel the stop effect in a direction of rotation just by rotating the rotating actuator away from the stop. Conversely, the stop device blocks the other direction of rotation of the setting shaft accordingly.

Both introduced rotating actuators can be designed in such a way relative to their stop device or devices as to comprise an annular element that concentrically envelops the setting shaft and is coupled to the rotation of the setting shaft. In addition, such a stop device has allocated to it an activation device, fixed in place relative to a rotation of the annular element, which activates the stop device to block or impede the rotation of the annular element. For example, such an activation device can be an open ring concentrically enveloping the annular element like a clip, whose free ends are connected via the activation device. After the activation device has been activated, this clip-like ring is rigidly connected with the annular element enveloping the setting shaft, either

non-positively or positively. The activation device can be an electromagnet or a memory metal that can be heated with a heating device, for example.

In the case of a rotating actuator according to the second proposed solution, the stop arrangement can be a stop unit allocated to the setting shaft or annular element. The respective other element, i.e., annular element or setting shaft, has allocated to it a pocket open to the respective other element, i.e., setting shaft or annular element, in which the stop unit engages. The right and left limits of such a pocket then form the stops for the stop unit. The necessary slip in the stop arrangement is generated by a corresponding free space between the stop unit and its lateral limits. In this case, it may be advisable to essentially center the stop unit in such a stop arrangement, at least when not actuating the handle. This can be realized, for example, by arranging spring elements braced against the stop unit between the right and left limits of such a pocket and the stop unit.

In a particularly preferred configuration, such a rotating actuator has not only a stop device, but also a device that can be enabled and disabled to generate a haptic interface when the handle is turned. This haptic interface-generating device is advantageously designed like a mechanical latch, which yields a precisely predetermined haptic interface when the setting shaft is turned. This rotating actuator also comprises an activation device, advantageously electromagnetically actuated, which acts on at least one of the two elements that mechanically interact to generate the haptic interface, i.e., latching cam plate or latching element. Actuating or triggering the activation device makes it possible to enable or disable interaction between the latching cam plate and the one or more latching elements. The activation device can be set up to act on the one or more latching elements, for example, allowing them to engage in the cam plate or lift away from the latching cam plate, depending on the design of the activation device. The activation device can correspondingly also be set up to act on the latching cam plate or the element carrying the latching cam plate. In this configuration, the one or more spring-biased latching elements engage in the latching cam plate. The latching cam plate is advantageously allocated to an annular element that concentrically envelops the setting shaft. When the setting shaft is turned without the activation device actuated, the latching

cam plate is also made to rotate by the latching element that engage in the latching cam plate, so that no haptic interface can be discerned in this rotating actuator mode. Only after the activation device has been triggered is the element carrying the latching cam plate fixed relative to a rotation of the setting shaft, so that when the setting shaft is subsequently turned, the one or more latching elements are guided by the latching cam plate to generate the desired haptic interface. The advantage to such a configuration is that it prevents undesired setting shaft movements caused by a latching element that might not precisely engage in a recess when switching from one haptic interface to another haptic interface. Such haptic interface-induced movements of the setting shaft are undesired in some applications.

The invention shall be described below based on exemplary embodiments with reference to the attached figures. Shown on:

Fig. 1: is a three-dimensional representation of a rotating actuator, exploded view,

Fig. 2: is a three-dimensional view of the mounted rotating actuator on Fig. 1, viewed in the direction of a haptic interface-generating device,

Fig. 3: is a longitudinal section through the rotating actuator on Fig. 2, as applied in a joystick,

Fig. 4: is a diagrammatic cross section through another rotating actuator having a stop device, stop device deactivated, and

Fig. 5: is the rotating actuator on Fig. 4, stop device activated.

A rotating actuator 1 comprises a pivoted setting shaft 2, at whose operating end a rotary button 3 is secured as the handle. The setting shaft 2 extends through a mask 4, so that the mask 4 covers the setting shaft sections located under the rotary button 3. The rotary actuator 1 also comprises a haptic interface-generating device 5, which in the

embodiment depicted in the figures includes two latching cam plate rings 6, 7, a brake flange 8 connected with the setting shaft 2, along with latching sleeve assemblies 9, 10 offset by 90° relative to each other, which each consist of two opposed latching bolts 12, 12' braced against each other by a compression spring 11. The latching bolts 12, 12' are each arranged along with the compression spring 11 in a sleeve-like receptacle 13 of the setting shaft 2. The latching cam plate rings 6, 7 are float-mounted relative to the rotation of the setting shaft 2. The haptic interface-generating device 5 also comprises three activation devices 15, 16, 17 combined into a clamping bell 14. The activation devices 15, 16, 17 are designed as a clamping ring, and can be electromagnetically actuated. An activation device hence comprises a clamping ring 18, as shown on the activation device 15, along with an electromagnet 19 for actuating the clamping ring 18. When the electromagnet 19 is actuated, the clamping ring 18 can be tightened. The remaining activation devices 16, 17 are set up accordingly. The clamping rings 18 of the activation devices 15, 16 envelop the latching cam plate ring 6 and 7. In this case, the inner diameter of the clamping rings 18 slightly exceeds the outer diameter of the latching cam plate rings 6, 7. Actuating the electromagnet 19 of an activation device 15, 16 causes the respective latching cam plate ring 6 or 7 to become fixed, since it is held non-positively in the clamping ring 18. The clamping bell 14 with its activation devices 15, 16, 17 is rigidly fixed in place relative to a rotation of the setting shaft 2.

The activation device 17 interacts with the brake flange 8 in a corresponding manner, so that actuating the electromagnet of this activation device 17 makes it possible to use an increase in the necessary torque to rotate the setting shaft 2, or also to prevent and block a rotation. The latter case will be explained in greater detail later.

With the rotating actuator 1 mounted in place, the two respective diametrically opposed latching bolts 12, 12' each engage in the latching cam plate of one latching cam plate ring 6, 7. This may be discerned from a bottom view shown on Fig. 2. When the rotating actuator 1 is turned without actuating the electromagnets of an activation device 15, 16, 17, the setting shaft 2 can be turned without a haptic interface being provided by the latching cam plate rings 6,7. The spring-biased latching bolts 12, 12' engage in the

latching cam plate of each latching cam plate ring 6, 7, moving them along when the setting shaft 2 rotates. The clamping ring 18 closes during the activation of an electromagnet of an activation device, e.g., electromagnet 19 of activation device 15, so that the latching cam plate ring 6 incorporated by the clamping ring 18 is fixed relative to a rotation of the setting shaft 2. When the setting shaft 2 is rotated, the two latching bolts 12, 12' are now moved in the latching cam plate of the latching cam plate ring 6, so that a haptic rotation takes place corresponding to the latching cam plate contained in the latching cam plate ring 6.

In order to realize a haptic stop, the activation device 17 can be triggered in such a way that tightening the clamping ring 17 of this activation device prevents a rotation of the setting shaft 2.

The activation devices 15, 16, 17 can be triggered individually or by group to generate varying haptic interfaces.

Fig. 3 shows a longitudinal section of the rotating actuator 1, wherein the rotating actuator 1 is part of a joystick (not shown in any greater detail) in this configuration. The setting shaft 2, and hence the rotary button 3, are mounted so that they can pivot along with the clamping bell 14 containing the activation devices 15, 16, 17; Fig. 3 shows the rotating actuator 1 pivoted out of its neutral position.

The haptic capabilities to be realized with simple means for the rotating actuator 1 enable it to be part of a joystick (see Fig. 3) without much effort, since only a single assembly – clamping bell 14 – must also be pivoted. Fig. 3 symbolically represents a linkage 20 that guides the pivoting movement of the setting shaft 2.

The brake flange 8 shown on Fig. 1 consists of an annular element 21 that envelops the setting shaft 2, and is physically connected with the setting shaft 2 via several elastic bending spokes S_B. The bending spokes S_B permit a relative rotation of the annular element 21 with respect to the setting shaft 2. The annular element 21 has incorporated

into it pockets T that open toward the setting shaft 2, in which the free end of a stop beam A engages, which is rigidly connected with the setting shaft 2 as the stop unit. The lateral limits of such a pocket T respectively constitute the right and left stops relative to a stop beam A. Therefore, the two stops formed by a pocket T represent a stop arrangement. A rotation of the annular element 21 is blocked when the activation device 17 is activated. The setting shaft 2 can hence only still be moved in the slip range with which a stop beam A engages in a pocket T. On Fig. 1, the stop beams A are roughly centrally located inside each pocket. Once the activation device 17 becomes active with the objective of providing a stop for the rotation of the setting shaft, the respective stop beams A abut against a stop provided by each pocket T, namely against the one intended to limit the currently executed rotation of the setting shaft 2. With the activation device 17 activated, and the rotation of the annular element 21 thus blocked, the setting shaft 2 can then be turned back by the entire remaining slip in the direction opposite the stop, even though the stop device is activated, and a rotation of the setting shaft 2 is essentially blocked.

Fig. 1 does not show an angle detection device that can be used to determine the rotational angle position of the setting shaft 2. Such an angle detection device can be mechanical or optoelectronic in design, for example. In any event, the resolution of the angle detection device is matched with the slip present between the stop beams A and the stops of a stop arrangement in such a way that such an aforementioned rotation of the setting shaft 2 counter to a stop can be detected by the angle detection device. The detection of such a rotation of the setting shaft 2 subsequently causes the activation device 17, and hence the entire stop device, to become deactivated so that the setting shaft 2 is again released in terms of its ability to rotate.

Fig. 4 shows another rotating actuator 22 basically set up similarly to the rotating actuator 1 on Fig. 1 – 3. The stop device 23 of this rotating actuator 22 differs in design from the configuration of rotating actuator 1. The stop device 23 comprises a first annular element 25 rigidly connected with the setting shaft 24. This annular element 25 carries several pockets T that open radially to the outside to each hold a stop unit G of a second outer annular element 26 that concentrically envelops the inner annular element 25. The stop

units G are designed as cogs, and each engage in one pocket T. In terms of the inside diameter of a pocket T, the stop units G are dimensioned in such a way that each stop unit G is accommodated in a pocket T with slip in the direction of rotation. Compression springs are arranged between the lateral limits of a pocket T in the direction of rotation and a stop unit G in order to achieve a centered arrangement of stop units G in the pockets T, in particular when the setting shaft 24 is not actuated. The annular element 26 is concentrically enveloped by an activation device 27, which comprises an open ring 28 arranged like a clip and an electromagnet 29. The outer annular element 26 has an array of teeth; a complementary array of teeth is arranged inside on the clip-like ring 28. Fig. 4 shows the activation device turned off, so that the setting shaft 24 can be freely rotated.

To bring about a stop, the electromagnet 29 is triggered, so that the clip-like ring 28 closes, and the array of teeth of the ring 28 meshes with that of the outer annular element 26. Since the activation device 27 is fixed in terms of a rotation of the setting shaft 24, and in particular of the annular element 26 as well, a rotation of the setting shaft 24 is impeded in this position, which is shown on Fig. 5. The setting shaft 24 was used beforehand to execute a counterclockwise rotation, as evident from the stop units G abutting the left stops of the pockets T. The spring arranged on this side has assumed a blocking function. The remaining slip with which each stop unit G is arranged in a pocket T is completely in the direction of rotation away from the active stop of a pocket in the position of the setting shaft 24 shown on Fig. 5. The setting shaft 24 remains moveable in this direction up to the additional stop of each pocket T. As with the rotating actuator 1 on Fig. 1 – 3, detecting a rotation within this slip using an angle detection device (also not shown in this embodiment) also causes the activation device 27 to be released and turned off, so that the setting shaft 24 can subsequently be freely moved again.

The stop devices shown in the embodiments are set up in such a way that the stop units always engage in the stop arrangement. Given a respective setting shaft that is freely rotating, the stop arrangement therefore turns along with it. When the stop device is activated to limit the rotation of the setting shaft, one of the two elements, i.e., stop unit

or stop arrangement, is fixed in place to prevent the setting shaft from rotating further. The stop device can be activated as a function of the respectively current status of the setting shaft position, which is monitored by a controller via the angle detection device. In this way, the setting shaft can go through several menu items as it would a list, with a stop being set up at the end of the list. It is also possible, given a change in the list length, to use software to alter the positions in which the stops are set or the stop devices are activated.

Heatable memory metals can also be used as activation devices in place of the electromagnets shown on the figures, in particular for the activation device responsible for the haptic interface. The advantage to using such activation devices is that they operate noiselessly.

Reference List

1	Rotating actuator
2	Setting shaft
3	Rotary button, handle
4	Mask
5	Haptic interface-generating device
6	Latching cam plate ring
7	Latching cam plate ring
8	Brake flange
9	Latching sleeve assembly
10	Latching sleeve assembly
11	Compression spring
12, 12'	Latching bolts
13	Receptacle
14	Clamping bell
15	Activation device
16	Activation device
17	Activation device
18	Clamping ring
19	Electromagnet
20	Linkage
21	Annular element
22	Rotating actuator
23	Stop device
24	Setting shaft
25	Annular element
26	Annular element
27	Activation device
28	Clip-like ring
29	Electromagnet
A	Stop beam
G	Stop unit
S_B	Bending spoke
T	Pocket

Claims

1. Rotating actuator with a rotatably mounted setting shaft and an activatable mechanical stop device for generating a stop to limit the rotation of the setting shaft in one or the other direction of rotation, and with an angle detection device for detecting a rotation of the setting shaft, **characterized in that** the stop device comprises two individual and independently triggered stop arrangements that act mechanically on the setting shaft, of which one provides a stop for limiting the rotation of the setting shaft to the right, and another stop arrangement limits the rotation of the setting shaft to the left.

2. Rotating actuator with a rotatably mounted setting shaft (2, 24) and an activatable mechanical stop device (23) for generating a stop to limit the rotation of the setting shaft (2, 24) in one or the other direction of rotation, and with an angle detection device for detecting a rotation of the setting shaft (2, 24), **characterized in that**, in order to limit the rotation of the setting shaft (2, 24) in a direction of rotation, the activated stop device (23) acts upon the setting shaft (2, 24) in such a way as to prevent the setting shaft (2, 24) from executing another rotation in the direction of rotation to be blocked by the stop device (23) by means of a stop associated with a stop arrangement acting mechanically on the setting shaft, and maintain the rotation of the setting shaft (2, 24) in a direction counter to the stop with slip in the stop arrangement, wherein the slip provided by the stop arrangement is dimensioned in such a way that a movement of the setting shaft (2, 24) in the direction of rotation counter to the stop can be detected by the angle detection device.

3. Rotating actuator according to Claim 1 or 2, **characterized in that** the one stop device (23) comprises an annular element (21, 26) that concentrically envelops the setting shaft (2, 24) and is coupled to the rotation of the setting shaft (2, 24), as well as an activation device (17, 27) fixed in place relative to a rotation of the annular element (21, 26) to block the rotation of the annular element (21, 26).

4. Rotating actuator according to Claim 3 relating back to Claim 2, **characterized in that** the stop arrangement comprises at least one stop member (A, G) allocated to the setting shaft (2, 24) or annular element (26), as well as at least one pocket (T) allocated to the respective other element, i.e., annular element (21, 26) or setting shaft (24), and open in a radial direction toward the other element (2, 24 or 26), whose right and left limits in the direction of rotation form the stops into which one respective stop unit (A, G) engages via the stop arrangements formed by the pockets (T).

5. Rotating actuator according to Claim 4, **characterized in that** the stop unit is a beam or a lug.

6. Rotating actuator according to Claim 4 or 5, **characterized in that** the stop unit (G) is held essentially centered in the stop arrangement by spring elements braced against the stops, at least when not actuating the handle.

7. Rotating actuator according to one of Claims 1 to 6, **characterized in that** the rotating actuator (1) has a device (5) for generating a haptic interface when the handle (3) is turned, wherein this device (5) is designed as a mechanical latch, and comprises a latching cam plate and one or more latching elements (12, 12') that engage in the latching cam plate, and the haptic interface-generating device (5) has allocated to it an activation device (15, 16) designed to act on the latching cam plate or one or more latching elements (12, 12') in such a way that triggering the activation device (15, 16) makes it possible to enable or disable interaction between the one or more latching elements (12, 12') and the latching cam plate to generate the haptic interface shaped by the latching cam plate during a rotation of the setting shaft (2).

8. Rotating actuator according to Claim 7, **characterized in that**, when activated, the activation device (15, 16) acts on the annular element (6, 7) that carries the latching cam plate and concentrically envelops the setting shaft (2), with the at least one

spring-biased latching element (12, 12') connected with the setting shaft (2) engaging in the latching cam plate of the annular element, in that the annular element (6, 7) carrying the latching cam plate is fixed by the activation device (15, 16) relative to a rotation of the setting shaft (2).

9. Rotating actuator according to Claim 8, **characterized in that** a non-positive connection is established between the activation device (15, 16) and the annular element (6, 7) carrying the latching cam plate when the activation device (15, 16) is activated.

10. Rotating actuator according to Claim 8, **characterized in that** a positive connection is established between the activation device and the annular element carrying the latching cam plate when the activation device is activated.

11. Rotating actuator according to Claim 9, **characterized in that** the activation device (15, 16) is an electromagnetically actuated clamping ring (18) that concentrically envelops the annular element (6, 7) carrying the latching cam plate, in which the annular element (6, 7) is held rigidly in place with the activation device (15, 16) activated.

12. Rotating actuator according to one of Claims 8 – 11, **characterized in that** the haptic interface-generating device comprises at least another latching cam plate as well as at least another latching element that engages in the latching cam plate, wherein another activation device acts on its elements, i.e., latching cam plate or latching element, so that they interact to generate a haptic interface.

13. Rotating actuator according to Claim 12 relating back to Claim 8, **characterized in that** the annular elements (6, 7) carrying the latching cam plates are arranged adjacently in different planes in terms of the longitudinal extension of the setting shaft (2).

14. Rotating actuator according to one of Claims 8 – 13, **characterized in that** an activation device (17) that acts on the setting shaft (2) and influences a rotation is provided.

15. Rotating actuator according to Claim 14, **characterized in that** an electromagnetically actuated clamping ring that concentrically envelops a brake flange (8) connected with the setting shaft (2) is used as the activation device (17) acting on the setting shaft (2).

16. Rotating actuator according to one of Claims 12 – 15, **characterized in that** the used activation devices (15, 16, 17) are combined into an assembly (14).